



REPLY TO  
ATTENTION OF

DAMO-FDQ

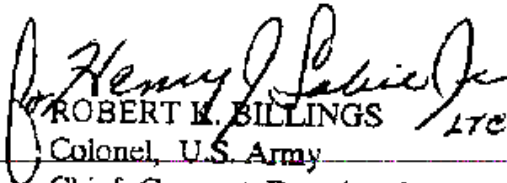
DEPARTMENT OF THE ARMY  
OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS  
400 ARMY PENTAGON  
WASHINGTON DC 20310-0400

16 July 1996

MEMORANDUM FOR DIRECTOR, JOINT STAFF DIRECTORATE J-6 ATTN: J-6I  
(LTC ROPER)

SUBJECT: Validation Testing of Military Standard 2525-Common Warfighting  
Symbolology

1. The Army has long been a proponent for the validation testing of Military Standard 2525-Common Warfighting Symbolology, prior to accepting the standard. The Army believes that MIL STD 2525A will be acceptable for the use in future digitized battlefield displays. The validation test objectives must be developed jointly and the test be administered by a single team. However, the Services must be allowed to incorporate the test into Service specific exercises.
2. The Army believes that MIL STD 2525 should be tested against STANAG 2019 for the force domain testing. Specific comments to the proposed test plan are contained at TAB A. POC for this action is LTC Salice, DSN 227-6676.

  
ROBERT M. BILLINGS LTC, GS  
Colonel, U.S. Army  
Chief, Concept, Doctrine &  
Force Policy

DAMO-FDO

SUBJECT: Validation Testing of Military Standard 2525, -Common Warfighting Symbology

1. The following are Army comments concerning the proposed validation test plan. Request the Joint Staff review these comments and successfully address the Army concerns:

a. Page 1, Section II, 1st para: Who will provide for the funding for the SunSpac or Hewlett Packard workstations?

b. Page 2, Section II, 1st para: The symbology has already been through a recognition test using STANAG 4420. What data can be collected from previous tests? Further more the Army prefers to test MIL STD 2525 with STANAG 2019 and FM 101-5-1 for the force domain test.

c. Page 2, Section II, para 3: If the test subjects are to be officers and enlisted from the Services, the Army does not see a requirement to also test a limited group of civilians "to measure performance in absence of prior experience." This appears to add unnecessarily to the cost of the test.

d. Page 3, Section IV, first bullet: Identify the "lead organization."

e. Page 3, Section IV: The Army Staff does not believe that the entire process should take 18 months. The longer this is dragged on the more expensive the test becomes.

f. Page 3, Section IV, bullet 3, the term "test sites" is taken to be synonymous with the term "exercise sites." It is the intent of the Army and the Marine Corps to conduct the test during a funded exercise such as Prairie Warrior.

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g. Page 3, Section V, Budget. The Army would like an explanation of the estimated cost. See the Army's budget estimate in the Army's proposed plan (Enclosure 1).

h. Page 4, para 1: The Army wants STANAG 2019 and FM 101-5-1 be added to the test. REASON: Completeness.

## **SAMPLE VALIDATION TEST PLAN**

1. In formally evaluating results, criteria for test stimuli should include:
  - a. Known standards for discriminability, searchability and learnability.
  - b. Content criteria (the breadth and information depth of a symbol).
  - c. Tactical criteria (assessing the impact on tactical decision making).

Testing tasks should concentrate on 'search' (the ability to detect icons in arrays based on features) and peripheral cueing (the commonality between symbols that make them less distinguishable, minimizing feature saliency). When processing multiple symbols, it is necessary that 'discrimination' and 'display clutter' be addressed. The validation could be a four step exercise and to compress the time identified with each phase, the phases could overlap in certain areas.

Phase I. Develop software for the 'confusion' experiment, and test Service officers separately. The tests should be MIL STD 2525 versus STANAG 4420 for the engagement domain personnel and MIL STD 2525 and FM 101-5-1 versus STANAG 2019 for the force domain personnel. These should be 'within' and 'between' subjects designs (within branch sets and between branch sets), dependent measures being search times, detection times, errors of commission and degrees of quality of results, with data submitted to multivariate analysis and to canonical correlation for analysis. Estimate for above; Experimenters (2 @ \$10K/month, 5 months = \$100K.); Assistant (1 @ \$8K/month, 2 months = \$16K.); Equipment: 1 Computer at \$16K; Travel: 2 TDY's \$3.2K; Software Contract \$50K. Service Subjects = \$0. Total: \$185.2K.

Phase II. Devise a hand-written test, with template, where enlisted personnel are required to draw symbols to a battle scenario. Compare how symbols are drawn and interpreted using MIL STD 2525 and FM 101-5-1. This should be a 'within' subjects design, dependent measures being time to complete, errors made in doing so, and effectiveness of the product, with data submitted to multiple ANOVA techniques for analyses. Estimate for above; Experimenter (1 @ \$10K/4 months = \$40K); Assistant (1 @ \$8K/2 months = \$16K); Equipment (templates @ \$5 each @ 20 = \$100.00); TDYs \$2K; Service Subjects: \$0. Total: \$58.1K.

**Phase III.** Devise a test to determine how quickly/slowly naive subjects can learn MIL STD 2525A symbolics. This should be a 'within' subjects design, with 3 levels of stimuli complexity, dependent measures being times taken to learn and percent of errors made while doing so, with data submitted to a canonical correlation for predicting difficulties in areas of each symbol set. Estimate for above; Experimenter (1 @ \$10k/5 months = \$50K); Assistant (1 @ \$8K/2 months = \$16K); Equipment \$0; TDYs \$2K; Software contract @10K; Service Subjects: \$0. Total: \$68K.

**Phase IV.** Write software for comparison tests during Exercise PRAIRIE Warrior 97 for use on the MSC/Phoenix system, where MIL STD 2525A and FM 101-5-1 v. 1985 are portrayed to compared mission results. Create questionnaires concerning MIL STD 2525A performance. Also video and audio tape personnel during the action for future assessment. Estimate for above; Experimenter (2 @ \$10K/4 months = \$80K); Assistant (1 @ \$8/1 month = \$8K); Equipment (Video @ \$500); TDYs \$3K; Contract for Software \$30K; Service Subjects: \$0. Total: \$121.5K.

**Total Estimate: \$432.8K**



DEPARTMENT OF THE AIR FORCE  
HEADQUARTERS UNITED STATES AIR FORCE  
WASHINGTON, DC

MEMORANDUM FOR LT COL NED ROPER (J61)

23 JUL 1996

FROM: HQ USAF/SCTA  
1250 Air Force Pentagon  
Washington, DC 20330-1250

SUBJECT: Validation Testing Of Military Standard 2525 - Common Warfighting Symbology,  
J6A00524-96, 17 June 96

We have reviewed the test plan and the following comments are provided:

a. We are concerned that conducting the testing in a highly sanitized laboratory environment using SunSparc or Hewlett Packard workstations will not adequately simulate the operational systems and environment where the MIL-STD will be used. The validation testing must consider the various sizes and types of displays that may use the MIL-STD. A better validation test would be to use existing simulators for these systems (i.e. Operations Centers, AWACS, ABCCC etc.) as the basis for test methodology rather than an engineering-type workstation. Operational personnel who actually use the displays would simulate operational conditions. This validation approach should not require additional resources because existing simulators would be used; however, simulator availability must be coordinated well in advance of testing. This also has the potential to reduce overall testing costs.

b. The draft plan implies that a contractor will be responsible for executing a detailed validation plan. We believe that the contractor should also be responsible for preparing the plan to include operational validation considerations. The Services, Joint organizations and other DOD agencies would provide inputs to and review and coordinate on the plan.

c. We support the test plan; however, FY 96 funding is not available at this time and no FY 97 funding has been budgeted for this requirement. We believe that DASA, Center for Standards should fund this effort as part of their responsibility for developing and managing DOD standards.

d. We believe the overall schedule is too long and the associated cost is too high. The schedule should be shortened to less than 12 months. The cost should not exceed \$400K.

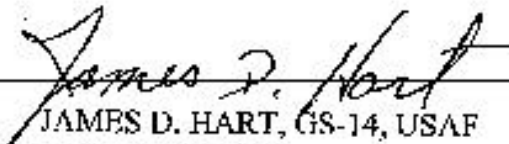
e. A test management plan ~~should be written and coordinated to identify~~  
organizations and their responsibilities.

f. We cannot commit to participating in the testing until we know to what extent (i.e. number of sites, workstations and operators) and what resources are required of the participating organizations. We will attempt to identify a test site when these details have been

identified. We do not agree with overseeing data collection at the test site. We believe that the testing team/staff should be responsible for data collection.

g. The Air Force has no additional testing requirements.

h. Change title of test plan from Military Standard 2525 to Military Standard 2525A. Rationale: The validation test plan is to test MIL-STD 2525A not the entire MIL-STD 2525.

A handwritten signature in black ink, reading "James D. Hart", is positioned above a horizontal line.

JAMES D. HART, GS-14, USAF

Architecture Division

Directorate of Architecture and Technology

DCS/Communications and Information



UNITED STATES MARINE CORPS  
MARINE CORPS COMBAT DEVELOPMENT COMMAND  
QUANTICO, VIRGINIA 22134-5001

IN REPLY REFER TO  
3900  
C 422  
18 Jul 96

From: Commanding General, Marine Corps Combat Development  
Command, 3300 Russell Road, Suite 318A, Quantico, VA  
22134-5001 (C 422)  
To: Chairman, Joint Chiefs of Staff (J6I), ATTN: LTC Ned  
Roper, Washington, D.C., 20318-6000  
Via: Commandant of the Marine Corps (CS)  
Subj: REVIEW OF VALIDATION TEST PLAN FOR MILITARY STANDARD  
(MILSTD) 2525A: COMMON WARFIGHTING SYMBOLOGY, VERSION 2  
Ref: (a) MILSTD 2525A, Version 2  
(b) Draft Validation Test Plan of May 1996  
(c) JCS (J6I) Tasking Document J-6A00524-96 of 17 Jun 96

1. Reference (a) is the draft military standard (MILSTD) 2525A, Common Warfighting Symbolology, of 9 July 1996. Reference (b) is the draft validation test plan for MILSTD 2525A. Reference (c) requested comments and recommendations on the content of the draft document. References (b) and (c) have been reviewed and we concur with the content with the below noted exceptions:

a. Do not concur with testing the MILSTD 2525A symbolology against the symbolology represented in NATO STANAG 4420. The MILSTD should be tested against a valid symbol set recognized in U.S. systems. STANAG 4420 has not been ratified by the U.S. and does not represent a valid symbolology standard to compare the MILSTD 2525A set against. Instead, it should be measured against a valid symbol set such as that found in STANAG 2019, which is ratified by the U.S. The U.S. implementation of STANAG 2019 is FM 101-5-1, Operational Terms And Symbols. That publication presents the current USMC/U.S. Army recognized symbol set against which the MILSTD should be evaluated.

b. The Marine Corps continues to insist that operational testing be conducted prior to validation and implementation of this updated version of the MILSTD. While the Marine Corps supports the concept of developing a standard set of symbols, there are issues concerning the readability of these symbols when used in tactical C4I systems. The impact of operator error induced by poorly designed symbolology are far reaching and potentially deadly to friendly forces. The impact of using these symbols in a fast paced, tactical scenario has not yet been tested in the operational environment. This is a serious shortcoming that only validation testing can resolve.

c. Recommend revisiting the financial estimates contained within the draft plan and competitively bidding the contract

Subj: REVIEW OF VALIDATION TEST PLAN FOR MILITARY STANDARD  
(MILSTD) 2525A: COMMON WARFIGHTING SYMBOLOGY, VERSION 2

before continuing. Informal inquiry seems to indicate that the cost figures cited in the draft plan could be reduced considerably as a result of such competitive bidding. The U.S. Army has ~~done some work in this area that warrants further~~ consideration.

2. MCCDC point of contact is Major M.E. Krivdo, Doctrine Division, at DSN 278-2872, Com1 (703) 784-2872.

*Alfred A. Cortez*  
ALFRED A. CORTEZ  
By direction





DEPARTMENT OF THE NAVY  
HEADQUARTERS UNITED STATES MARINE CORPS  
2 NAVY ANNEX  
WASHINGTON, DC 20380-1775

C4I/CSIM IN REPLY REFER TO:  
MCAOM 057-96  
21 Jul 1996

From: Major Shelton Lee, CSIM Branch, CS Division, C4I Department  
To: LTC Ned Roper, USA, Joint Chief of Staff, J6I Directorate, J-6A 00524-96

Subj: VALIDATION TESTING OF MILITARY STANDARD 2525  
-COMMON WARFIGHTING SYMBOLOGY

Encl: CGMCCD, Memo, subject same as above, dated 18 Jul 96

1. I concur with the general concept of the proposed document. However, I recommend the issues identified in the enclosure be resolved prior to the final joint action.
2. If you have any questions, contact me at (703) 695-1817.

A handwritten signature in cursive script, appearing to read "S. Lee", is positioned above the printed name.

S. LEE

25 Jul 96

From: NTCS-A Requirements Officer (N62), CDR Whitkop  
To: Joint Staff (J61, LTC Roper)

Subj: NAVY ACTION OFFICER RESPONSE VALIDATION TESTING OF MILITARY  
STANDARD 2525 - COMMON WARFIGHTING SYMBOLOGY TASKING

Ref: (a) Joint Staff Tasker, J-6A 00524-96, with attachment

1. Pursuant to reference (a), the Navy received an action item/tasker to review and comment on a draft version of the Validation Test Plan for MIL-STD-2525 common Warfighting Symbolology. The following comprises an action officer review of subject document.

a) In the cover sheet, para 3c2 it states that the attached plan "...does not describe procedures for assessing standard symbolology operationally. This portion of the validation process will be developed in coordination with the Services at a later date." If this plan is approved, we must still stand fast in not endorsing the mandatory implementation of 2525 until it has been operationally tested. Lab tests, as described in the plan, are only a start. They must be completed in an operational setting to hold validity.

b) Section II para 1

- states "The test session will be conducted with the operator seated at normal viewing distance from the monitor and under normal (i.e., standard office) ambient lighting." This is only one environment where this will be used and others must be evaluated, including dark room and colored lighting conditions. The environment itself is also but a part of the equation, as are the various levels of decision makers viewing the display, since the displays are scaleable across the various C4I systems, and their ability to discern the symbolology.

- Additionally, the test procedures call out for testing to be performed using standard tactical hardware (workstations with high-resolution color monitors). Not all systems that will be required to use 2525 will have high resolution color screens. Many tactical displays will be monochrome and lower resolution.

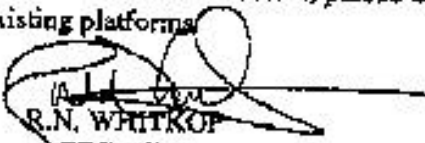
These two issues are critical considerations as part of the testing, in order "...to evaluate its effectiveness in an operational environment."

c) Section V BUDGET

- The issues of funding for the testing are still being forced on the CSA's. Deficiencies against the POM will result in inadequate testing unless testing is funded out of OSD.

- The implications in the FY 97 para include: "...access to space, workstations, and operators and oversee data collection efforts at each site during the six-month testing period." No indications of numbers required for sites and personnel.

2. This plan is a good initial start, but philosophical issues that existed for the inception of MS 2525 with deep service exceptions, are still unresolved, to include heading down the path toward service funding. If the MCEB is going to mandate the implementation of this document, pursue OSD funding to support adequate testing and implementation on existing platforms.

  
R.N. WHITKOP  
CDR USN